General Therapeutics and Materia Medica. With one hundred and twenty Illustrations. Adapted for a Medical Text Book. By Robley Dunglison, M.D. Third Edition, revised and improved. In Two Volumes. Philadelphia, 1846. 8vo.—*From the same.*

Prof. Henry laid before the Society the results of some investigations that he had lately made in physical science, and a theory of the causes of the phenomena observed. The well known phenomenon of a ball resting on a jet of water, he ascribed to the action of three different causes—1st. To the adhesion of the water to the ball. 2d. To the adhesion of the water to itself. 3d. To the tendency of water to move in a straight line, and also to the principle of action and reaction. He had also made experiments in regard to the interference of heat, for the purpose of discovering whether certain phenomena of interference of light were exhibited as well in the case of caloric. He found it to be so, and that two rays of heat may be thrown on each other, so as to produce a reduction of temperature.

The Society then proceeded to an election of members.

Dr. Patterson, from the Committee of Finance, reported the liquidation of the debt of the Society to the estate of the late Nathan Dunn.

All other business of the evening having been concluded, the ballot boxes were opened, and the following gentlemen declared to be elected members of the Society:—

Richard L. M'Culloch, of Philadelphia.

Ceva Grimaldi, Marquis of Pietracatella, of Naples.

Stated Meeting, November 6.

Present, twenty-nine members.

Dr. Chapman, President, in the Chair.

Mr. R. L. M'Culloch, a newly elected member, was introduced, and took his seat.

Letters were received and read:—

From the Royal Society of Sciences of Copenhagen, dated

March 20th, 1846, announcing their reception of the Transactions and Proceedings of the Society; and also another from the same body, stating that they had forwarded donations to the Library of the American Philosophical Society:—

From the Literary and Philosophical Society of Manchester, dated April 27th, 1846, acknowledging the receipt of the Transactions and Proceedings of this Society: and,—

From Dr. S. G. Morton, dated Philadelphia, October 26th, 1846, proposing to exchange books for the Mexican skull in the possession of the Society.

The following donations were announced:—

FOR THE LIBRARY.

Det Kongelige Danske Videnskabernes Selskabs Naturvidens kabelige og Mathematiske Afhandlinger. Ellevete Deel. Med 16 Kobbertavler og et Kort. Copenhagen, 1845. 4to.—*From the Royal Society of Copenhagen.*

Collectanea Meteorologica sub auspiciis Societatis Scientiarum Danicæ edita. Fase III. Continens Observationes in Guinea Institutas. Hauniæ, 1845. 4to.—*From the same.*

Oversigt over det Kgl. Danske Videnskabernes Selskabs Forhandlinger og dets Medlemmers Arbeider i Aaret, 1844 og 1845. Copenhagen, 1845, 1846. 8vo.—*From the same.*

Naturlehre des Schönen von H. C. Orsted. Ausdem Dänischen von H. Beise. Hamburg, 1845. 8vo.—*From the Author.*

Expedition Shells: described for the Work of the United States Exploring Expedition, commanded by Charles Wilkes, U. S. N., during the Years 1838—1842. By Augustus A. Gould, M.D. Boston, 1846. 8vo.—*From Capt. Wilkes.*

Oration delivered before the Agricultural and Mechanics' Association of Louisiana, on the 12th of May, 1845, by Judge P. A. Rost. Philadelphia, 1845. 8vo.—*From the Hon. Jos. R. Ingersoll.*

On the Volcanoes of the Moon. By James D. Dana. Read before the Association of American Geologists and Naturalists, September, 1846. Extracted from the American Journal of Science, Vol. II. Second Series. 8vo.—*From the Author.*

Dr. Patterson informed the Society, that the planet lately discovered by Le Verrier, had been observed by Gallé, of Berlin, on the 23d September, 1846; on the 23d October, at

Washington, D. C.; and on the 24th, at the High School Observatory of this city.

The reference to a paper presented at the preceding meeting of the Society, led Professor Henry to make some remarks on the corpuscular hypothesis of the constitution of matter.

He stated that this subject has occupied attention at every period of the history of science; and though, at first sight, speculations of this kind might appear to belong exclusively to the province of the imagination, yet, in reality, he considered this hypothesis a fruitful source of valuable additions to our knowledge of the actual phenomena of the physical world. Though simple insulated facts may occasionally be stumbled upon by a lucky accident, the discovery of a series of facts, or of a general scientific principle, is, in almost all cases, the result of deductions from a rational antecedent hypothesis, the product of the imagination; founded, it is true, on a clear analogy with modes of physical action, the truth of which have been established by previous investigation.

In constructing an hypothesis of the constitution of matter, the simplest assumption, and indeed the only one founded on a proper physical analogy, is, that the same laws of force and motion which govern the phenomena of the action of matter in masses, pertains to the minutest atoms of these masses.

It is a well established fact, that portions of matter at a distance tend to approach each other, and when they are brought very near, to separate, and still nearer again, to approach; and so on through several alternations. In the present state of science, we consider these actions as ultimate facts, to which we give the name of attracting and repelling forces; and without attempting to go behind them, we may study their laws of variation as to intensity and direction under different circumstances, and particularly in reference to a change of distance. Bodies or masses of matter are also subjected to fixed laws of motion, which have been classed under three heads, namely, the law of inertia, or tendency to resist a change of state, and to move in a straight line with a constant velocity; the law of the coexistence of separate motions; and the law of the equality of action and reaction.

The explanation of a mechanical phenomenon consists in its analysis, and the reference of its several parts to the foregoing laws of force and motion; and as no phenomenon, whether it relates to masses or the minutest portions of matter, is fully explained until it

can be referred to one or more of these laws, it follows that any corpuscular hypothesis which does not ascribe to each atom of matter the property of obedience to the same laws, must be defective. It was for this reason, said Professor H., that in printing a syllabus of my lectures, about two years ago, I was induced to make some additions to the assumptions on which the corpuscular hypothesis of Boscovich is founded. According to this celebrated hypothesis, a portion of matter consists of an assemblage in space of an indefinite number of points kept at a given distance by attracting and repelling forces. These points have relative position, but not magnitude, and are merely centres of action of the forces which affect our senses; and since all our knowledge of matter is derived from the action of these forces, to infer that these points are any thing more than the centres of forces, is going beyond our premises.

This hypothesis readily explains the statical properties of bodies, such as elasticity, porosity, impenetrability, solidity, liquidity, crystallization, resistance to compression when a force is applied to either side of a body, &c.; but it fails to account for the dynamic phenomena of masses of matter, or those which are referrible to the three laws of motion. It is not, therefore, enough, that we assume, as the elements of matter, an assemblage of points in space, from which merely emanate attracting and repelling forces; we must also suppose these points to be endowed with inertia, or a tendency to resist a change of state, whether of rest or motion, and a tendency to move in a straight line; also to possess the property of preserving the effects of a number of impulses, as well as that of transferring motion from one point to another, the one losing as much motion as the other gains. But the admission of the existence of points with such qualities, brings us back to the Newtonian hypothesis of matter.

According to the view we have given, a portion of matter consists of an assemblage of indivisible and indestructible atoms endowed with attracting and repelling forces, and with the property of obedience to the three laws of motion. All the other properties, and indeed all the mechanical phenomena of matter, so far as they have been analyzed, are probably referrible to the action of such atoms, arranged in groups of different orders, namely, of ultimate atoms, chemical atoms, simple molecules, compound molecules, particles, &c.; the distance in all cases, between any two atoms, being much greater than the diameter of the atoms or molecules.

In order that we may bring the phenomena of the imponderable agents of nature, as they are called, under the category of the laws

of force and motion, we are obliged to assume the existence of an ethereal medium formed of atoms, which are endowed with precisely the same properties as those we have assigned to common matter; and this assumption leads us to the inference, that matter is diffused through all space.

That something exists between us and the sun, possessing the properties of matter, may be inferred from the simple fact, that time is required for the transmission of light and heat through the intervening space. The phenomena of the transmitted motion, in these cases, are perfectly represented by undulations, in a medium composed of very minute atoms of ordinary matter, endowed with all the mechanical properties we have mentioned. Indeed, the motion is analogous, though not precisely similar to the transmission of sound through air; the time, however, in the two cases, being very different. Light passes the space between us and the sun in about eight minutes, while sound, through air, would require 13⅔ years to perform the same journey. This difference in velocity is, however, readily explained by a difference in density and elasticity of air, and the ethereal medium. That the phenomena of light and heat from the sun are not the effect of transmission, without intervening matter, of mere force, such as that of attraction or repulsion, is evident from the fact, that these actions require no perceptible time for their transmission to the most distant part of the solar system. If the sun were at once to be annihilated, the planet Neptune would, at the same instant, begin to move in a tangent to its present orbit. Also, the phenomena of electricity and magnetism involve the consideration of time; the discharge of the former through a copper wire is transmitted with about the velocity of light, and the development of the latter, in an iron bar, is attended with a change in the ponderable molecules of the metal, which requires time for its completion.

According to the foregoing views we may assume, with Newton, the existence of one kind of matter diffused throughout all space, and existing in four states, namely, the ethereal, the aëriform, the liquid, and the solid. This method of presenting the atomic hypothesis of the constitution of matter, may at first sight appear startling; but on a little reflection, it will be found a necessary consequence of the attempt to explain the mechanical phenomena of matter by an assemblage of separate atoms. It may be objected to the assumption of one kind of matter, that the fact of the imponderable nature of light, heat, electricity and magnetism, require at least two kinds of matter; but if we adopt the theory of undulation, the phenomena of

the imponderables, as they are called, are merely the results of the motions of the atoms of the ethereal medium, combined, in some cases, with the motion of the atoms of the body; and since the vibrations of the atoms of a mass of matter do not increase the attraction of the earth on the mass, an increase of temperature in a body cannot change its weight; and also because the ethereal medium fills all space, a portion of this medium can no more exhibit weight, than a quantity of air when weighed in the midst of the atmosphere.

The points here noticed, relate merely to the fundamental conceptions of the corpuscular or atomic constitution of matter, and not to the arrangement of the atoms into systems of groups, which are necessary to represent the varied and complicated mechanical and chemical phenomena exhibited in the physical changes going on around us. Though he could not, at this time, attempt to give any details of the application of this hypothesis, he drew attention to one class of facts, of which it is important to furnish an expression in the arrangement of the atoms. He alluded to the facts of polarity, or those which exhibit the action of opposite forces at the extremities of molecules or of masses. The north and south poles of two magnets, brought together, neutralize each other; the attraction of one is balanced by the repulsion of the other, and the point of junction is without action on a third ferruginous body. In the same manner, apparently, two chemical elements which enter into combination exhibit a neutralizing effect, which indicates the existence of polar forces in the phenomena of chemical action. Nothing, however, is perceptible of this kind in the effects of gravitation; the action of two particles on each other does not interfere with the action, at the same time, of these two, on any number of other particles.

In conclusion, it should be remembered that the legitimate use of speculations of this kind is not to furnish plausible explanations of known phenomena, or to present old knowledge in a new and more imposing dress, but to serve the purpose of suggesting new experiments and new phenomena, and thus to assist in enlarging the bounds of science, and extending the power of mind over matter; and unless the hypothesis can be employed in this way, however much ingenuity may have been expended in its construction, it can only be considered as a scientific romance worse than useless, since it tends to satisfy the mind with the semblance of truth, and thus to render truth itself less an object of desire.